pears to afford some explanation of the failures of Muller, Pouillet and of the author in his early attempts to obtain evidence of current force being manifested when a circuit was formed between an artery and a vein in the living animal.

4. "On a new Series of Organic Bodies containing Metals." By Dr. E. Frankland, Professor of Chemistry, Owen's College, Manchester. Communicated by B. C. Brodie, Esq., F.R.S. Received May 10, 1852.

The author communicates in this memoir the continuation of his researches, a preliminary announcement of which appeared several years ago, upon a new series of organic compounds closely allied to cacodyl in their composition and properties, and which, like that body, are formed by the union of the alcohol radicals with various metals, and are distinguished for their powerful electro-positive character. These remarkable compounds are procured by the action of heat or light upon their proximate constituents, and are thus distinguished from most other organic compounds of this nature by the manner of their formation. The author describes seven of these compounds.

Stanethylium.—When iodide of ethyl and metallic tin are exposed to the influence of heat or light, which is most conveniently done in sealed glass tubes, the tin gradually dissolves in the ethereal liquid, which finally solidifies to a mass of colourless crystals. A quantity of gas, comparatively very small, is generated at the same time. This gaseous product of the reaction proved, on analysis, to be a mixture of hydride of ethyl and olefiant gas, produced from the decomposition of iodide of ethyl by tin into iodide of tin and ethyl, which last is transformed at the moment of its liberation into the two gases just mentioned. The principal and most important reaction, however, consists in the direct union of tin with iodide of ethyl, giving rise to a crystalline body which is the iodide of a new organic radical, *stanethylium*.

By double decomposition the other compounds of stanethylium can be readily formed; the author has prepared and described the oxide, chloride, bromide and sulphide of stanethylium; these bodies exhibit a striking resemblance to the corresponding bi-compounds of tin, but are distinguished from them by a peculiar pungent and irritating odour resembling that of the volatile oil of mustard.

If a slip of zinc be immersed in a solution of chloride of stanethylium, dense oily drops soon form on the surface of the zinc, and finally collect at the bottom of the vessel. This oily liquid is the radical stanethylium, which possesses the following properties:—it exists at ordinary temperatures as a thick heavy oily liquid of a yellow or brownish-yellow colour, and an exceedingly pungent odour resembling that of its compounds, but much more powerful. It is insoluble in water, but soluble in alcohol and ether. At about 150° C. it enters into ebullition, but is simultaneously decomposed, metallic tin being deposited In contact with air stanethylium rapidly absorbs oxygen, and is converted into oxide of stanethylium.

Chloride, iodide and bromide of stanethylium are instantaneously formed by the action of chlorine, iodine and bromine, or their hydrogen acids respectively, upon stanethylium. The two first are in every respect identical with the salts above mentioned, and the identity of the bromide is further proved by an ultimate analysis. The formula of stanethylium is $C_4 H_5 Sn$; that of the oxide $C_4 H_5 SnO$, and that of the bromide $C_4 H_5 Sn Br$. Stanethylium therefore perfectly resembles cacodyl in its reactions, combining directly with the electro-negative elements, and regenerating the compounds from which it has been derived.

Stanmethylium and stanamylium are formed when the iodides of methyl and amyl respectively are exposed to the action of light in contact with tin; their salts are isomorphous with those of stanethylium, but they have not yet been completely investigated.

Zincmethylium.—This radical is formed in an uncombined state when iodide of methyl and zinc are exposed to a temperature of about 150° C. in a sealed tube; the zinc gradually dissolves with an evolution of gas, whilst a mass of white crystals and a colourless mobile liquid refracting light strongly, occupy, after a few hours, the place of the original materials. In this reaction two distinct decompositions take place, viz. the decomposition of iodide of methyl by zinc with the production of iodide of zinc and liquid zincmethylium, and the decomposition of iodide of methyl by zinc with the formation of iodide of zinc and the gaseous radical methyl. The zincmethylium was obtained pure by distillation in an atmosphere of dry hydrogen. Its formula is $C_2 H_3 Zn$, and it possesses the following properties. It is a colourless, transparent and very mobile liquid, possessing a peculiar penetrating and insupportable odour, and boiling at a low temperature. Zincmethylium combines directly with oxygen, chlorine, iodine, &c., forming somewhat unstable compounds. Its affinity for oxygen is even more intense than that of potassium; in contact with atmospheric air it instantaneously ignites, burning with a beautiful greenish blue flame, and forming white clouds of oxide of zinc; in contact with pure oxygen it burns with explosion, and the presence of a small quantity of its vapour in combustible gases gives them the property of spontaneous inflammability in oxygen. Thrown into water, zincmethylium decomposes that liquid with the evolution of heat and light; when this action is moderated, the sole products of the decomposition are oxide of zinc and hydride of methyl.

The extraordinary affinity of zincmethylium for oxygen, its peculiar composition, and the facility with which it can be procured, cannot fail to cause its employment for a great variety of transformations in organic compounds; by its agency there is every probability that oxygen, chlorine, &c. can be replaced atom for atom by methyl, and thus entirely new series of organic compounds will be produced, and clearer views of the rational constitution of others be obtained.

The gaseous methyl formed simultaneously with zincmethylium is identical in composition and properties with the methyl derived from the electrolysis of acetic acid; it was mixed, however, with

hydride of methyl generated by the decomposition of accompanying zincmethylium vapour by the water over which the gas was collected.

Zincethylium and zincamylium are homologous bodies formed by similar processes; their investigation is not yet completed.

Hydrargyromethylium.—The author has only yet studied the iodide of this radical, which is formed by the action of sunlight upon iodide of methyl and metallic mercury. After an exposure of several days to sunlight, white crystals begin to form in the liquid, which finally solidifies to a white crystalline mass; ether dissolves out the new compound and deposits it perfectly pure by spontaneous evaporation.

Iodide of hydrargyromethylium ($C_2 H_3 HgI$) is a white solid, crystallizing in minute nacreous scales, which are insoluble in water, moderately soluble in alcohol, and very soluble in ether and iodide of methyl; it is slightly volatile at ordinary temperatures, and exhales a weak but peculiarly unpleasant odour, which leaves a nauseous taste upon the palate for several days. At 100° C. the volatility is much greater, and the crystals are rapidly dissipated at this temperature when exposed to a current of air. At 143° C. it fuses and sublimes without decomposition, condensing in brilliant and extremely thin crystalline plates. In contact with the fixed alkalies and ammonia it is converted into oxide of hydrargyromethylium, which is dissolved by an excess of all these reagents.

A corresponding compound containing amyl is formed, though with difficulty, under similar circumstances, but the attempts to form one containing ethyl have not yet been successful. Preliminary experiments have also been made with other metals, amongst which arsenic, antimony, chromium, iron, manganese and cadmium promise interesting results.

From a review of the composition and habits of all the organo-metallic bodies and their compounds at present known, the author is of opinion that the view most generally held respecting the constitution of cacodyl, according to which that radical is a conjugate compound consisting of arsenic conjugated with two atoms of methyl, and which view must, if true, be applied to all the organo-metallic bodies, is no longer tenable; and he contends that the behaviour of these bodies clearly indicates that they are compounds formed upon the type of the oxides of the respective metals, a portion of the oxygen being replaced by the several radicals, methyl, ethyl and amyl; the establishment of this new view of their constitution will remove these bodies from the class of organic radicals, and place them in the most intimate relation with ammonia and the bases of Wurtz, Hofmann and Paul Thenard; indeed the close analogy between stibethine and ammonia first suggested by Gerhardt, has been most satisfactorily demonstrated by the behaviour of stibethine with the haloid compounds of methyl and ethyl. Stibethine furnishes us therefore with a remarkable example of the law of symmetrical combination, and shows that the formation of a five-atom group from one containing three atoms can be effected by the assimilation of two atoms, either of the same or of opposite electro-chemical character: this

remarkable circumstance suggests the following question. Is this behaviour common also to the corresponding compounds of arsenic, phosphorus and nitrogen, and can the position of each of the five atoms with which these elements respectively combine be occupied indifferently by an electro-negative or an electro-positive element? This question, so important for the advance of our knowledge of the organic bases and their congeners, cannot now long remain unanswered.

5. "On the Dentate Body of the Cerebellum." By William Brinton, M.D. Communicated by R. B. Todd, M.D., F.R.S. &c. Received May 23, 1852.

The corpus dentatum has generally been described and recognised as a wavy line or lamina of grey matter, which is seen in certain sections of the crus of the cerebellum, and contains fibres apparently derived from the restiform body, and the processus e cerebello ad testes. Reil's account, with some vague and conflicting details, gives it a more definitely tubular form, although he is apparently not certain of the continuity of its upper and lower layers posteriorly.

The author explains these somewhat varying descriptions by the physical characters of the tissues investigated, and by the condition —fresh or hardened in spirit—of the specimens examined by different anatomists.

He deduces the form and situation of the recent corpus dentatum by uniting numerous and successive sections made in the three directions of space*. Its arrangement with respect to the fibres of the cerebellum, cerebrum, medulla oblongata, and medulla spinalis, is chiefly deduced from examinations of specimens hardened in alcohol.

By these two methods he is led to the following conclusions, that each corpus dentatum forms a tubular investment to the extremity of the processus e cerebello ad testem; it is open towards the fourth ventricle, and is connected with the opposite body by a commissure of grey matter in its median line. While its interior exclusively receives the fibres of this cerebro-cerebellar peduncle, its exterior radiates fibres to the various lobes of the cerebellum, which fibres, at the bottom of each lobe-stem, become inseparably mixed with a bundle from the restiform body, and with another from the pons varolii.

Its *comparative anatomy* in mammalia corresponds with this view; its *minute anatomy* does not contradict it. And while the *physiological import* of this arrangement eludes all conjecture, the author has little doubt that its anatomical structure and relations are best comprehended in the formula which he would thus assign to it, viz. that of being the cerebro-cerebellar ganglion.

6. "Proof of a sensible difference between the Mercurial and Air-Thermometers from 0° to 100° C." By J. J. Waterston, Esq.

* Diagrams to this effect accompanied the paper.